

Wound Tracking on iPhone Report

Summary

The application is a simple, portable, and useful iPhone application for the quick documentation and review of wounds and/or burns. The application provides the ability to create a database of patients, search through the patients, and use the built-in camera to take annotatable pictures to store with associated patients for later review. It was built to fill a documented need in the healthcare community. It was built and tested with Apple's iPhone SDK using Xcode.

Background

Medical software is notoriously expensive and over-engineered, often with awkward user interfaces. To compound the problem, previous mobile devices were also had inadequate specifications and equally awkward interfaces. This relegated much of the medical software to non-portable devices, which further increased overhead and decreased efficiency.

Apple's iPhone is a computationally capable device with an expertly crafted user interface. And although the platform is closed and proprietary, it provides an unparalleled user experience for both end-users and developers. End-users are provided with an easy to use avenue for safely finding, acquiring, and installing 3rd-party applications, and developers are provided with an equally easy to use avenue for advertising, selling, and deploying their applications, with Apple doing most of the heavy lifting for both parties.

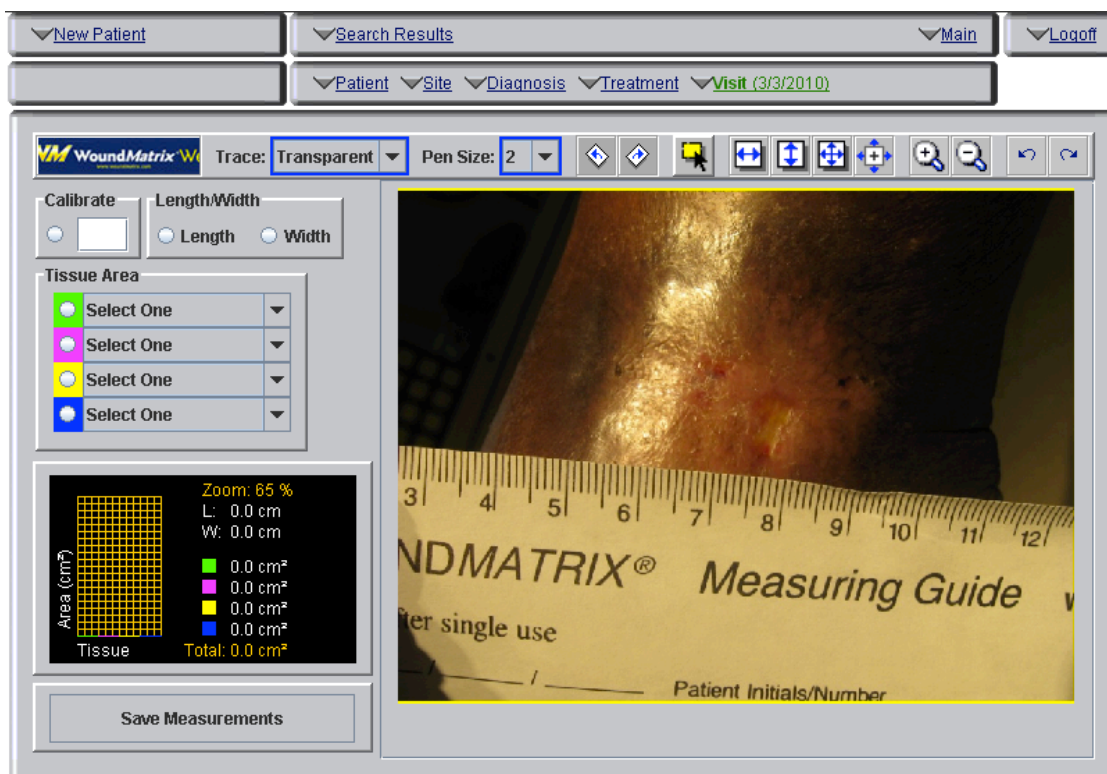
The tools and services available for developers of iPhone applications greatly reduces the overhead and cost of development, which can translate to lower prices for the end-user.

The current marketplace and tools mean there is a significant opportunity for a new type of medical software development to fill needs created by the lack of software, or the existence of only inadequate software.

Case study: WoundMatrix¹

One existing solution for wound/burn tracking is called WoundMatrix. It has several weaknesses:

- It is very expensive, with total operating costs reaching \$100,000
- It requires both a full computer and a camera
- It has an awkward user interface



Actual users of WoundMatrix have said:²

“We do have a big problem in our workflow and need some kind of solution.”

¹ Aceos WoundMatrix <<http://woundmatrix.com>>

² Interview with nursing staff at the Johns Hopkins Bayview Wound Care Center (JHBMC - WCC)

[We] “do not have time in between patient care to chart patient assessment and progress notes in the WoundMatrix system.”

“The device will certainly have to be pocket-size so that it can be carried around easily in our lab pocket.”

“The new solution will need to have a feature to search and retrieve patient information from a list so that we don’t have to go through a long list of patients to locate the specific patient.”

Need

Healthcare workers, such as nurses in hospitals, are tasked, among many other things, with tracking the progress of open wounds on their patients. They tend to do so by taking pictures of any particular wound on a regular schedule and uploading them to some central repository. This is done for several reasons. It enables other people, such as doctors or specialists, to view the pictures and make medical decisions based on them. It also allows the facility to keep track of a wound, and see how it changes over time. One may be interested in seeing how the wound shrinks or grows over time, how the shape changes, how the colors changes, etc.

Current systems can be bulky, difficult and time consuming to use, and expensive. Workers use digital cameras or even ultra mobile PCs, or UMPCs, which are actually cumbersome and pricey. They use these devices to take the images and then upload them to a dedicated software system, such as WoundMatrix. These software systems can be prohibitively expensive and annoying to use. For instance, it may require that the worker manually resize and adjust each image, which can be time consuming.

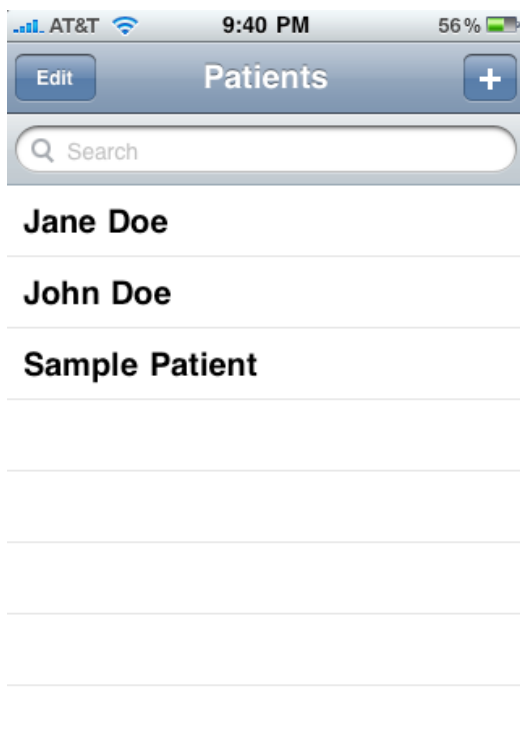
Design Details

iPhone application development is done using Xcode, currently at version 3.2.2, Interface Builder, currently at version 3.2.2, and the iPhone SDK, currently at version 3.2, on the Mac OS X Snow Leopard platform, currently at version 10.6.3.

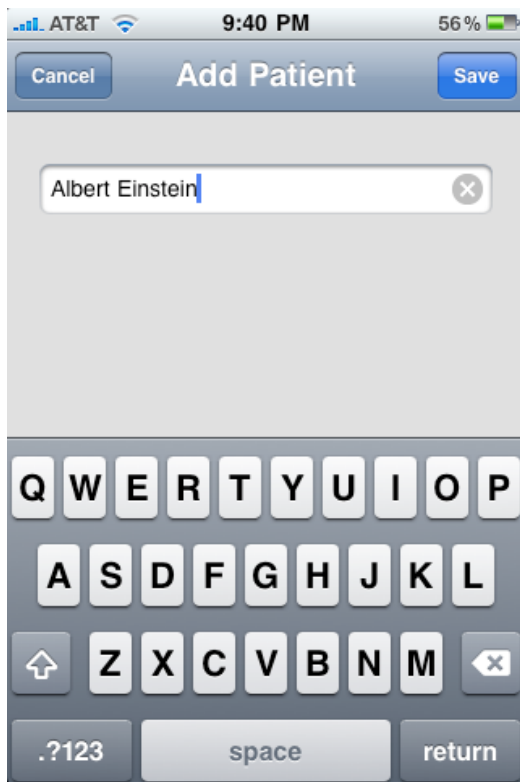
The application uses the standard Cocoa Touch with standard interface elements. It utilizes Core Data for data persistence and access.

A Mercurial repository was utilized for version control.

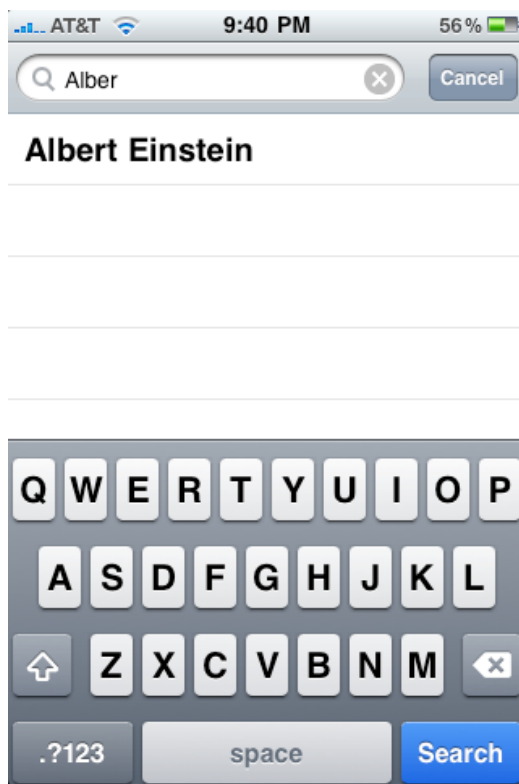
The patient list:



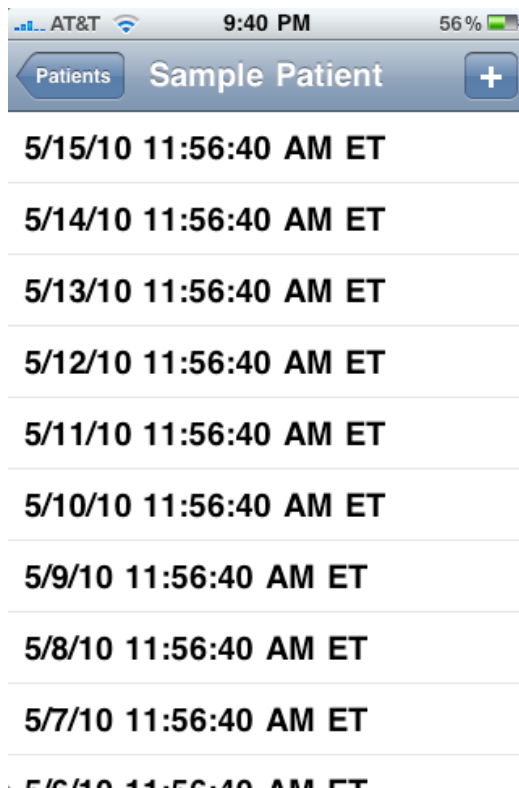
Adding a patient:



Searching for the patient:



Listing the snaps for the patient:



Taking a new image:



Viewing an image:



Discussion

The application uses standard elements, is easy to use, and performs well and reliably. More advanced features that could be implemented include further patient information, healthcare system integration/information sharing, and image annotation/automatic image processing.

Specifics

If necessary, the source code is available upon request from Gregory Kurtz at GKurtz1@gmail.com, and should have been emailed with this report.

References

Interview with nursing staff at the Johns Hopkins Bayview Wound Care Center
(JHBMC - WCC)

Aceos WoundMatrix <<http://woundmatrix.com>>

Apple iPhone Dev Center <<http://developer.apple.com/iphone/index.action>>